
Transboundary Collaboration



Understanding the current level of transboundary and international collaboration in North America related to drought monitoring

Identifying opportunities to strengthen or expand collaboration



NADM

**You can't improve what you
don't monitor**

Importance of
monitoring as part
of broader EWS

Sustaining interest and
networks between
droughts

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**Drought will be back,
wherever you are**

NADM

**The best we can do with
what we have**

Drought is
complex

All three countries
face similar
challenges

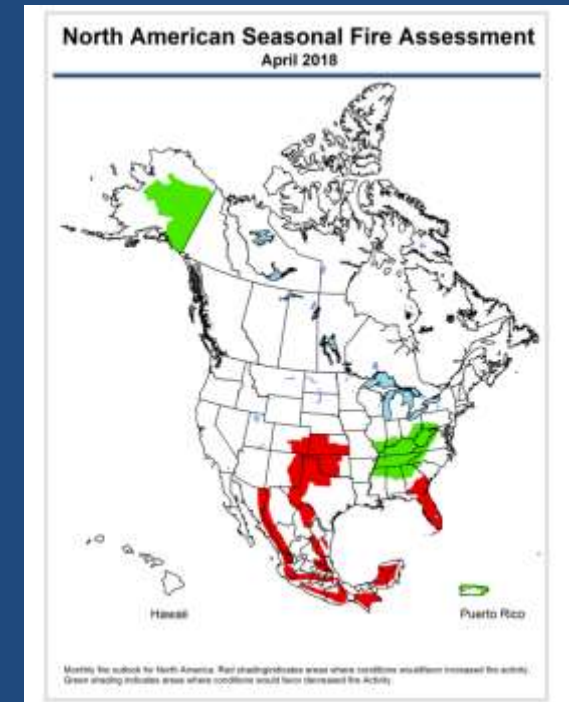
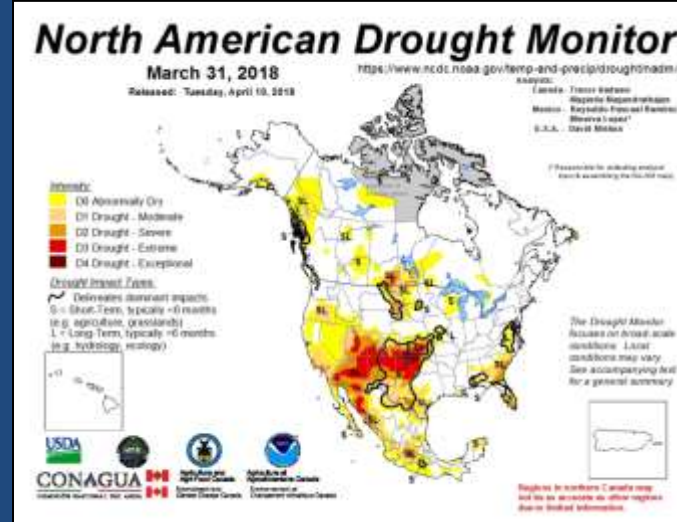
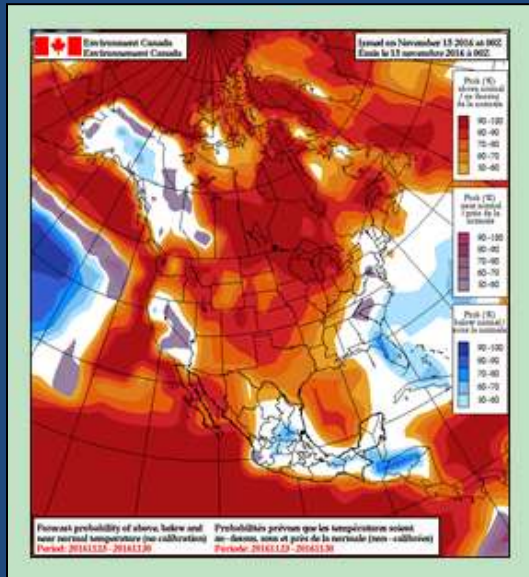
NADM

**It's reassuring to see others
get it wrong**

Why bother working across borders?

- Seamless visualization of information
- Consistency in communication in border areas
- Increased access to data and information
- Sharing experiences
- Establishing a network

Long history of transboundary collaboration across North America



North American Climate Services Partnership (NACSP)



Foundational Capabilities

- Forecasts and monitoring
- Precipitation

Thematic Areas

- Drought
- Wildfires
- (Health)

Regional Focus Areas

- Gulf of Maine
- Great Lakes
- Rio Grande-Bravo
- (Alaska/Canada NW)

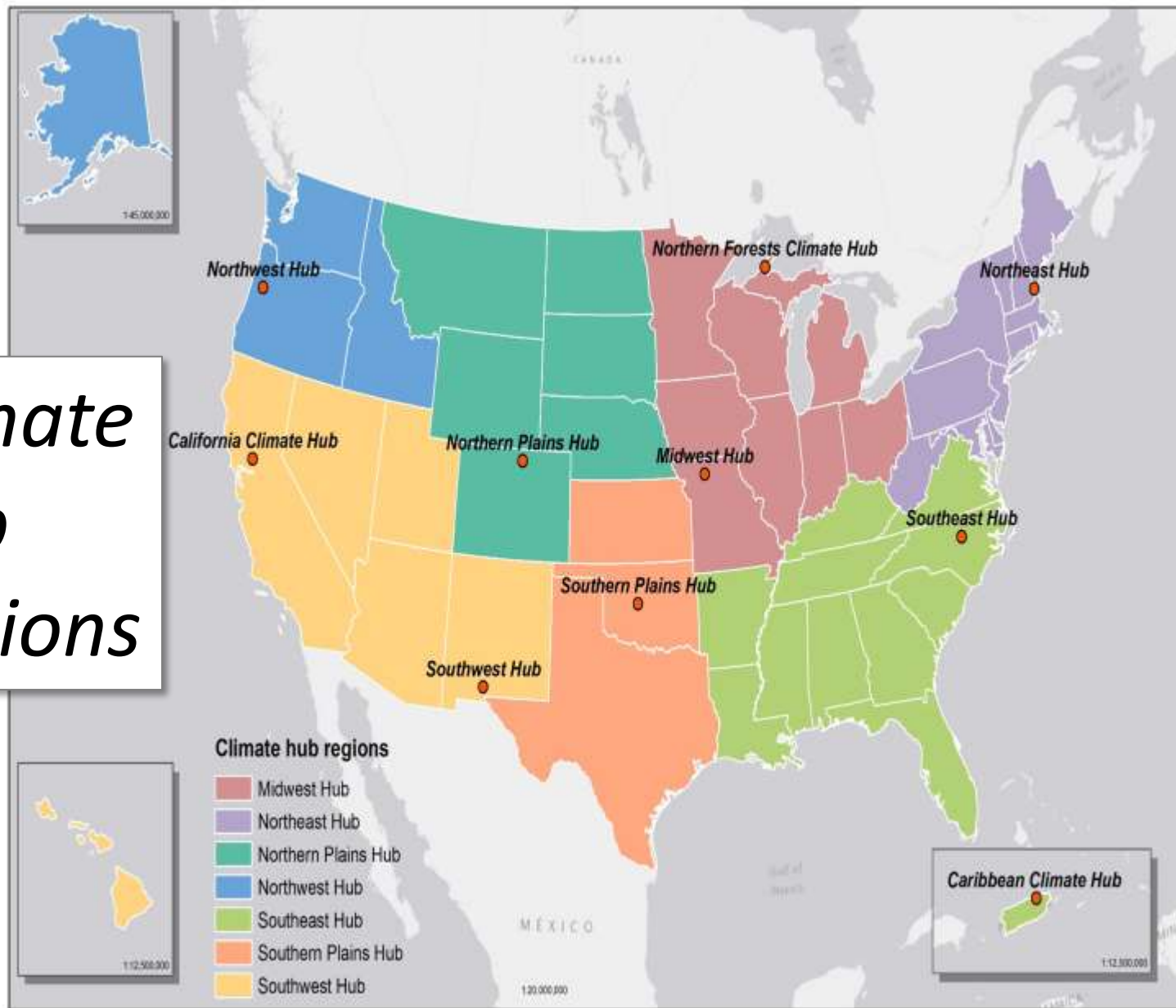
Session approach

1. BRIEF overview of three existing 'regional' networks that utilize drought monitoring
2. Interactive session to identify opportunities for enhanced cross-border collaboration
 - Product and Tools
 - Observation Networks and Data Access
 - Research
 - Regional Exchange
 - Global Connections

USDA Climate Hubs

- Where we are
- What we do
- Engaging with Canada and Mexico
- Areas for collaboration

Climate Hub Regions



Service Layer Credits: Esri, HERE, DeLorme, Mapbox, and the GIS user community

Climate Hub Activities

- Climate Hubs' mission: *"...to develop and deliver science-based, region-specific information and technologies, with USDA agencies and partners, to agricultural and natural resource managers that enable climate-informed decision-making, and to provide access to assistance to implement those decisions."*

Three focus areas

- Research and Science Information Synthesis
- Tool Development, Technology Exchange, and Implementation Assistance
- Stakeholder Education, Outreach, and Engagement

Engaging with Canada and Mexico

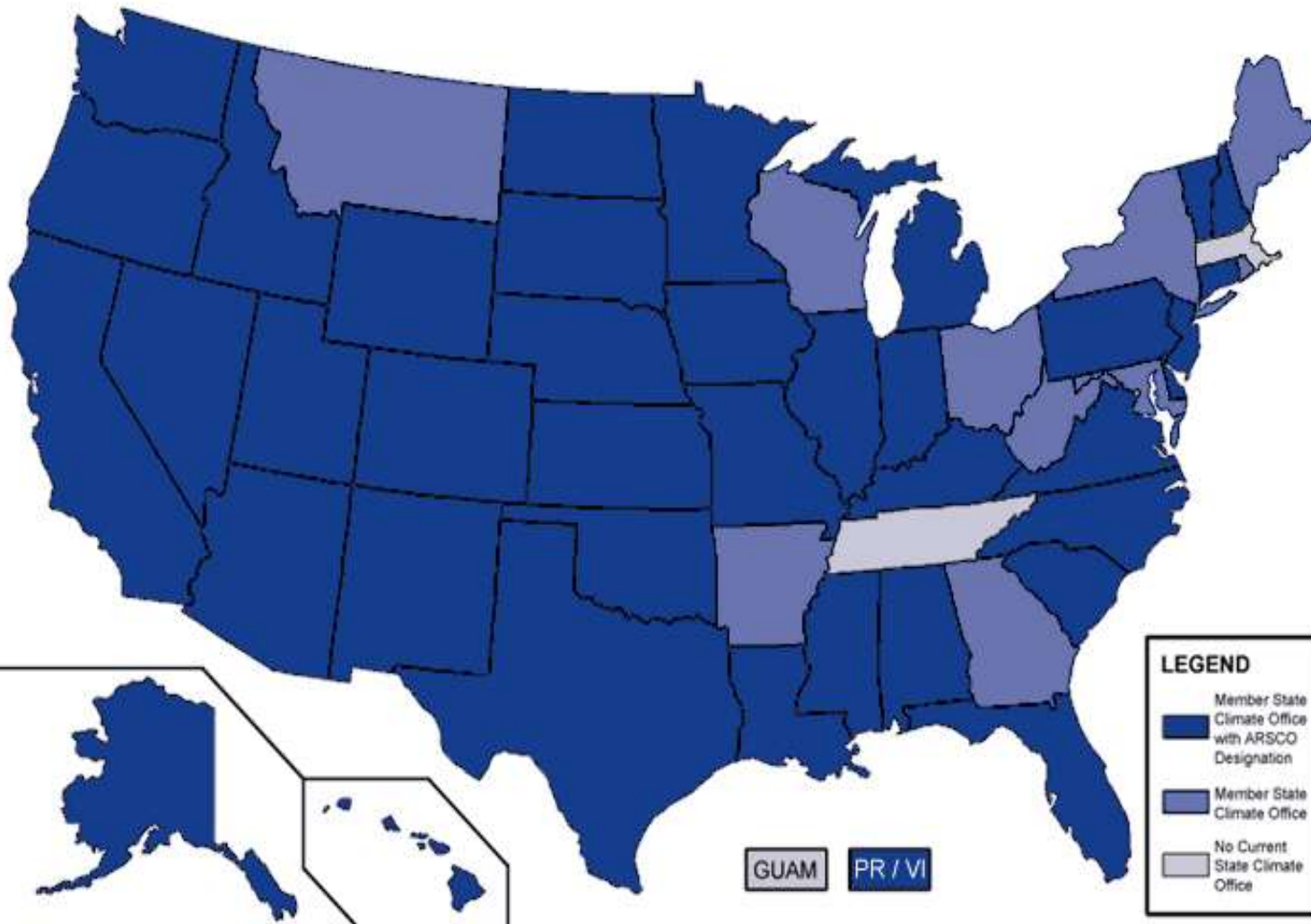
- Engagement with Mexican and Canadian colleagues has a much broader focus than drought
 - **NE** Climate Hub / AAFC – **Cross Border Workshop**, Syracuse NY, October 2017
 - **NW** Climate Hub / AAFC – discussing ^^ for western region
 - **SW** Climate Hub / SAGARPA / INCA-RURAL – Climate Change workshop for faculty and students from Universities in northern Mexico (arid lands), Las Cruces, December 2016.
 - **CA** Climate Hub – partners with UC Davis and USDA FAS on climate education partnerships for Mexican colleagues (Cochran Fellowship Program)

Potential collaborations – USDA Hubs

- Collaborative research syntheses
 - Drought adaptation and response
 - SW example – drought in irrigated systems
- Tool Development / Tech Exchange
 - Expanding country-specific tools across borders (e.g., AgBizLogic)
 - Cross-border workshops
 - Additional cross border workshops
 - Expanding mesonet (action step from Syracuse workshop)
 - Monthly webinars
 - Expanding products e.g., Grasscast
- Stakeholder Education, Outreach, and Engagement
 - Transforming / translating existing products

NOAA Related Groups

- Regional Climate Services Directors (RCSDs)
- NOAA Regional Collaboration Teams (RECOs)
- National Integrated Drought Information System (NIDIS)
- American Association of State Climatologists
- National Marine Fisheries Services (NMFS)
- Regional Integrated Science Assessment (RISA)
- Regional Climate Centers (RCCs)
- National Weather Service (NWS)
- National Ocean Service (NOS)



y Funded RISAs



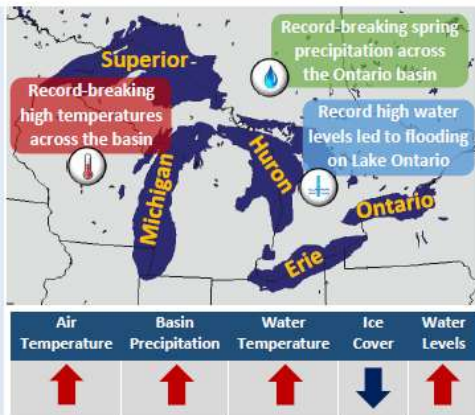
Current Cross Border Engagement



2017 ANNUAL CLIMATE TRENDS AND IMPACTS SUMMARY FOR THE GREAT LAKES BASIN



During the 2017 reporting period, several notable events and trends were observed across the Great Lakes basin including positive seasonal temperature and precipitation anomalies, flooding, and low ice cover. Winter and fall warm spells led to record warm temperatures in parts of the basin, while the majority of the region experienced a wet spring with persistent heavy rain and snowfall. Water levels in the five Great Lakes were above average, continuing a similar trend during the past several years. Due primarily to high spring rainfall, Lake Ontario reached its highest ever recorded water level in May 2017 resulting in shoreline flooding in New York and Ontario. At just 15.3% areal coverage, Great Lakes maximum ice cover for the year was 40% below the long-term average.



2017 Highlights: Record Breaking Year

High Temperatures

The winter of 2017 saw record-breaking warmth across the basin, with winter average temperatures 1 to 5°C above the long-term average. Fall warm spells in September and October also set temperature records in some Eastern areas of the region.

High Precipitation

The entire basin experienced a wet winter and spring with portions of Ontario experiencing more than twice the normal amount of precipitation in April and May. Fall was wet in the central Great Lakes, with Michigan experiencing record October rainfall.



Photo: Environment Climate Change Canada, Wendy Leger



Photo: Coastal Flooding Survey Project, Cornell University and New York Sea Grant

High Water Levels

Heavy winter and spring precipitation led to a record rise in Lake Ontario water levels from January to June. This caused major flooding on the shoreline of Lake Ontario and the St. Lawrence River in May 2017. The floods caused property damage, road and park closures, shore erosion, and untreated sewage dispersal.



2017 ANNUAL CLIMATE TRENDS AND IMPACTS SUMMARY FOR THE GREAT LAKES BASIN



Major Climatic Events

Winter 2016-2017

- Entire Great Lakes basin experienced near-record to record-breaking warmth in January and February.
- Great Lakes only reached a maximum ice cover of 15% compared to the long-term average of 55%.
- Reduced ice cover forced existing ice near shores to erode coastlines in areas such as Erie, Pennsylvania.
- Lake Ontario saw a record-breaking rise in water levels that continued into spring.

Spring 2017

- Record-breaking or near-record precipitation during the spring caused significant flooding.
- Water level on Lake Ontario rose sharply in spring and May saw the highest water levels recorded since records began in 1918.
- Due to severe flooding, Toronto Island park was closed from May 4th to July 30th.
- Freezing temperatures May 7-10 caused damage to vulnerable vegetation.



Photo: ©Toronto and Region Conservation (TRCA)

Summer 2017

- Lake Ontario set new record-high monthly average water levels in June and July.
- Areas of New York, including Watertown and Avon, experienced their wettest summers on record.
- High water levels and heavy precipitation resulted in several flash flood events across the basin.



Flooding and cooler temperatures caused many issues for farmers.



Western Lake Erie's harmful algal bloom was larger than average due to excessive spring and summer rain.



In the western basin first freezes occurred more than a month before the median first freeze dates.



Photo: Coastal Flooding Survey Project, Cornell University and New York Sea Grant

Autumn 2017

- Late season heat wave impacted the basin in late September, with many areas getting above 35°C (95°F).
- Record precipitation in portions of the Great Lakes region during October.
- A rapid transition from above-normal to below-normal precipitation led to harvesting difficulties in November.
- Cold conditions in early November broke records in southern Ontario, Pennsylvania, and New York.
- Lake Ontario had the highest decline in water levels on record for the month of September due to a dry August and September.
- Near-record high monthly water levels for Lake Superior in October and November.



Photo: Coastal Flooding Survey Project, Cornell University and New York Sea Grant



GLISA
A GREAT LAKES INITIATIVE



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada



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The National Integrated Drought Information System (NIDIS)

Moving the Nation from Reactive to Proactive Drought Risk Management

Transboundary Efforts

Britt Parker • NOAA NIDIS/UC-Boulder (CIRES)

North American Drought Monitor Forum

Calgary, Canada • May 1-3, 2018





Britt Parker



Molly Woloszyn



Elizabeth Ossowski



Amanda Sheffield



Veva Deheza



Elizabeth Weight

NIDIS DEWS



Rio Grande-Bravo Outlook

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ACKNOWLEDGEMENTS

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(SMN)

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Reynaldo Páez | Minerva López
Drought

Julio Martínez
Diagnostic Observations

Dario Rodríguez Rangel
Fire

Juan Saldaña Collin
Climate Services

Rio Grande|Bravo

CLIMATE IMPACTS & OUTLOOK

March 2018

Summary

Forecasts favor above-average temperatures and below-average precipitation for the Rio Grande-Bravo Basin through June.

AT A GLANCE

- 1** Rio Grande/Bravo Region
Dry, pre-greenup fuels coupled with windy and dry spring conditions will increase the potential for ignitions and rapid fire spread rates.
- 2** Tamaulipas and Chihuahua
Abnormally dry conditions continued in parts of Chihuahua and moderate to severe drought conditions developed in southern Tamaulipas.
- 3** New Mexico and North Texas
Precipitation was 0-70% of average from December-February for New Mexico and Northwest Texas.
- 4** North New Mexico and Texas
Extreme drought conditions have developed in northern New Mexico and persisted in northern Texas.



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PUBLISHED: Thursday, March 29, 2018

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Los pronósticos favorecen temperaturas superiores a la media y las precipitaciones inferiores a la media para la cuenca Río Grande/Bravo hasta junio.

AT A GLANCE

- 1** Región de Río Grande / Bravo
Las condiciones secas, junto con las condiciones secas y de viento de la primavera aumentarán las probabilidades de incendios forestales así como su propagación.
- 2** Tamaulipas y Chihuahua
Las condiciones anormalmente secas continúan en partes de Chihuahua y las condiciones de sequía moderada a severa se desarrollaron en el sur de Tamaulipas.
- 3** Nuevo México y el norte de Texas
La precipitación fue del 0-70% del promedio de diciembre a febrero para Nuevo México y el noroeste de Texas.
- 4** Norte de Nuevo México y Texas
Las condiciones extremas de sequía se han desarrollado en el norte de Nuevo México y persistieron en el norte de Texas.





RIO GRANDE|BRAVO CLIMATE IMPACTS & OUTLOOK
MARCH 2018



2017 Northern Great Plains Drought Assessment

**2017
NORTHERN
PLAINS
DROUGHT
ASSESSMENT**

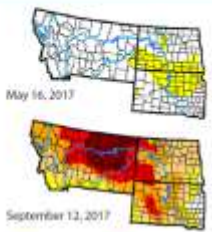
National Integrated Drought
Information System
Drought.gov
 



The Northern Plains drought started in the spring and summer of 2017 and sparked widespread wildfires and compromised water resources, leading to the destruction of property, livestock losses, and reduced agricultural production. These impacts were felt in South Dakota, North Dakota, Montana, by the tribes of the Northern Plains, and in the Canadian Prairies. The total estimated cost of the drought in the region was \$2.5 billion.

A drought snapshot: what happened in 2017?

The 2017 drought developed quickly. In early May, the U.S. Drought Monitor reported no drought in the region. By the end of the month, moderate (D1) drought began to develop in North and South Dakota. Over the course of just four weeks, from the beginning to the end of June, moderate, severe, and extreme drought (D3-D4) had spread across the Dakotas and into Montana. Exceptional Drought (D4), the most severe category, first appeared in North Dakota and Montana on the Drought Monitor on July 18, 2017. One week later, drought had spread to cover about 80% of both South Dakota and North Dakota, and most of the eastern half of Montana. While autumn brought some relief to the region, areas in all three states are still under a severe drought classification as of February 15, 2018.



May 16, 2017


September 12, 2017

Fig. 1. U.S. Drought Monitor maps showing the rapid development of the 2017 drought.


Legend:
 D0 No Drought
 D1 Moderate Drought
 D2 Severe Drought
 D3 Exceptional Drought
 D4 Exceptional Drought

Learning from the past to improve future resilience

NIDIS and partners will be looking back at the 2017 drought through two lenses: how can we improve drought early warning and how can we improve preparedness and response to lessen the impact of drought.


Attribution Study
 A study to measure the causes, predictability, and historical behavior of this and other Northern Plains droughts.

+


Drought Assessment
 An assessment to better understand the 2017 drought impacts, what actions were taken, and identify lessons learned and best practices.

**NORTHERN
PLAINS DROUGHT
ASSESSMENT**

National Integrated Drought
Information System
Drought.gov
 



Purpose of the Assessment

The 2017 Northern Plains drought was a rapid-onset, catastrophic event for northeast Montana, the Dakotas, and the Canadian Prairies in the spring and summer of 2017. The unique circumstances of this drought created an opportunity to evaluate and improve the efficacy of drought-related coordination and management within the Missouri River Basin Drought Early Warning System.

Drought Evolution

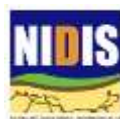
- Abnormally warm conditions in the fall of 2016 lengthened the growing season and increased the depletion of soil moisture. Fall is typically a time when vegetation growth has ended and soil moisture is conserved or gained with rainfall.
- A warm February caused the early melt of snowpack, so moisture was unavailable as soils warmed later in the spring season.
- Warmer-than-average temperatures continued into the spring and unusually persistent winds increased evapotranspiration.
- April and May rainfall was much below average, which is a critical stage for pasture, rangelands, foraging, and both winter and spring wheat.

Impacts

- Early impacts were noted in the agricultural sector, and impacts persisted for the duration of the 2017 drought.
- Cool-season grass species, which dominate much of the region, suffered from the lack of spring precipitation. The subsequent reduction in grass production for grazing in May led to a decline in pasture and range conditions.
 - Lower grass production for grazing forced ranchers to significantly reduce their herds by selling cattle early in May and June.
 - Stock ponds for livestock water supply were depleted and surface water samples showed signs of poor water quality (containing salts and total dissolved solids).
 - Livestock perished or exhibited poisoning symptoms due to poor water quality across the region.
- Poorly-performing crops and a shortage of pasture and forage led producers to harvest crops for feed.
- Some spring-planted crops failed to germinate, resulting in a total loss.
- Despite near-normal stream flows for the entire 2017 season, water supply to rural water providers was reduced in some areas. Rural water systems were restricted by their infrastructure and providers were not able to keep up with increased water demand, leading to water restrictions being enforced.
- Similar impacts to agriculture, livestock, and in some areas human health and domestic water supplies, were reported from Native American Tribes in the region.
- Agriculture in the southern Saskatchewan Prairies experienced poor spring germination, stunted crop development, heat stress, accelerated crop maturity, poor grain fill, below-normal yields, water supply shortages, poor pasture conditions, feed shortages, and wildfires. Livestock production was especially hard-hit due to the widespread scarcity of feed and water.



For more information about NIDIS, visit www.drought.gov



Agriculture and
Agri-Food Canada

Monthly/Bi-monthly Webinars

**National Integrated Drought Information System**
Drought.gov





**Pacific Northwest Drought Early Warning System
April Drought & Climate Outlook Webinar**
Monday, April 23, 2018 at 11 am - 12 pm PDT

These webinars provide the region's stakeholders and interested parties with timely information on current and developing drought conditions as well as climatic events like El Niño and La Niña. Speakers will also discuss the impacts of these conditions on things such as wildfires, floods, disruption to water supply and ecosystems, as well as impacts to affected industries like agriculture, tourism, and public health.


Featured Presentations


Climate Recap and Current Conditions
Philip Mote | OR State Climatologist




Seasonal Conditions & Climate Outlook
Jeremy Wolf | WFO Spokane

Snowpack Prediction
Sarah Kapnick | NOAA Geophysical Fluid Dynamics Laboratory

Climactic Resilience for Tree Fruit Production in Washington State
Lee Kalcits | Washington State University

**National Integrated Drought Information System**
Drought.gov





Join NIDIS and CNAP for the next

**CA-NV Drought Early Warning System
March Drought & Climate Outlook Webinar**
Monday, March 26, 2018 at 11 am - 12 pm PDT

These webinars provide the region's stakeholders and interested parties with timely information on current and developing drought conditions as well as climatic events like El Niño and La Niña. Speakers will also discuss the impacts of these conditions on things such as wildfires, floods, disruption to water supply and ecosystems, as well as impacts to affected industries like agriculture, tourism, and public health.

Featured Presentations

Drought Status Update & Outlook | Amanda Sheffield - NIDIS

Status & Impacts of the Current Snow Drought | Ben Hatchett - DRI

Ongoing & Developing Drought Impacts to Rangeland |
Jennifer Balachowski - USDA California Climate Hub;
Leslie Roche - UC Davis

Enhancing cross-border collaboration (product, process, community)

D0. PRODUCTS AND TOOLS

- Tool Development, Technology Exchange, and Implementation Assistance (e.g. GrassCast, CN drought outlook, wildfire outlook, guidebook on using indicators)
- Expanding existing products (e.g. regional outlook and impact reports; expand USDA products to include CN/MX)

D1. OBSERVATION NETWORKS and DATA ACCESS

- Expansion of current observation networks to improve products (e.g. mesonet in CN NW, include U.S. border stations in CN DM)

D2. RESEARCH

- Collaborative research, assessments (e.g. cold climates, drought and wildfire nexus, 'quality' of water)

D3. KNOWLEDGE EXCHANGE at REGIONAL LEVELS

- Stakeholder Education, Outreach, and Engagement (e.g., NADM river basins)
- Transforming / translating existing products (e.g. drought.gov)
- Information sharing (e.g. webinars)

D4. GLOBAL CONNECTIONS

- Policy and Science Fora